IN THE SPECIFICATION

After the title of the invention and before the heading "BACKGROUND OF THE INVENTION" insert the following:

CROSS REFERENCE TO RELATED APPLICATION

This is a divisional application of U.S. Application no. 09/815,177 filed March 21, 2001.

Please replace the following paragraph [005] with the following rewritten paragraph:

[005] In one aspect of the present invention, a system useable in electrical control sensors for shaft speed signal frequency change rate tests, detects intermittent or "in-range" failures. It has means for measuring frequency of a shaft speed signal; means for estimating a short-term variance ~~(standard deviation)~~ of the measured signal using the equation: $Var[x] = E[x^2] - E^2[x]$, where $E[x^2]$ is ~~] is~~ an estimated average of the squared measured signal over a short time interval, and $E^2[x]$ is a squared estimated average of the measured signal over a short time interval; means for comparing the estimated short term variance with a predefined variance limit for a predefined amount of time; and means for deeming the measured signal invalid, if the estimated variance exceeds the predefined variance limit for the predefined amount of time.

Please replace the following paragraph [006] with the following rewritten paragraph:

[006] In another aspect of the present invention, a system useable in electrical control sensors for shaft speed signal frequency change rate tests, detecting intermittent or "in-range" failures, has means for measuring frequency of a shaft speed signal; means for calculating a rate of change (time derivative) of the measured signal; means for estimating a short-term variance ~~(standard deviation)~~ of the measured signal rate of change using the equation: $Var[x] = E[x^2] - E^2[x]$, where $E[x^2]$ is an estimated average of the measured signal squared rate of change over a short time interval, and $E^2[x]$ is a squared estimated average of the measured signal rate of change over a short time interval; means for comparing the estimated short term variance with a predefined variance limit for a predefined amount of time; and means for deeming the measured signal invalid, if the estimated variance exceeds the predefined variance limit for the predefined amount of time.

Please replace the following paragraph [007] with the following rewritten paragraph:

[007] In a further aspect of the present invention, a method useable in electrical control sensors for shaft speed signal frequency change rate tests, detecting intermittent or "in-range" failures, has the steps: (a) measuring frequency of a shaft speed signal; (b) estimating a short-term variance ~~(standard deviation)~~ of the measured signal using the equation: $Var[x] = E[x^2] - E^2[x]$, where $E[x^2]$ ~~is]~~ is an estimated average of the squared measured signal over a short time interval, and $E^2[x]$ is a squared estimated average of the measured signal over a short time interval; (c) comparing the estimated short term variance with a predefined variance limit for a predefined amount of time; and (d) if the estimated variance exceeds the predefined variance limit for the predefined amount of time, deeming the measured signal invalid.

Please replace the following paragraph [008] with the following rewritten paragraph:

[008] In yet another aspect of the present invention a method useable in electrical control sensors for shaft speed signal frequency change rate tests, detecting intermittent or "in-range" failures, has the steps: (a) measuring frequency of a shaft speed signal; (b) calculating a rate of change (time derivative) of the measured signal; (c) estimating a short-term variance ~~(standard deviation)~~ of the measured signal rate of change using the equation: $Var[x] = E[x^2] - E^2[x]$, where $E[x^2]$ is an estimated average of the measured signal squared rate of change over a predefined short term, and $E^2[x]$ is a squared estimated average of the measured signal rate of change over the predefined short term; (d) comparing the estimated variance with a predefined variance limit for a predefined amount of time; and (e) if the estimated variance exceeds the predefined variance limit for the predetermined amount of time, deeming the measured signal invalid.

Please replace the following paragraph [0017] with the following rewritten paragraph:

[0017] Although developed for compressor and load shaft speed parameters of gas turbine engines, the method and system of the present invention can be applied for testing other sensed signals, such as exhaust gas temperature (EGT) probes signals. . An example of detecting EGT fault by using present invention is actually implemented in AS900 turbofan engine manufactured by Honeywell International, Inc..

Please replace the following paragraph [0018] with the following rewritten paragraph:

[0018] The preferred methods of the present invention either calculate an estimate of the variance ~~(standard deviation)~~ of the tested signal, or calculate an estimate of the variance of the rate of change of the tested signal. Due to oversampling, valid engine signals or signals rate of change do not change much and the change is smooth. Thus, they show a high ~~autocorrellation~~ autocorrelation and small variance over the short term. Erratic signals, such as signals corrupted by electrical noise, show rapid changes during certain failures, the signal becomes much less ~~correllated~~ correlated and thus the variance increases. For the four speed signal failure modes discussed above, the speed signal becomes much less ~~correllated~~ correlated and the variance of the signal or signal rate of change increases dramatically, allowing detection by a simple algorithm.

Please replace the following paragraph [0023] with the following rewritten paragraph:

[0023] Figure 3 illustrates a flowchart of this method embodiment of the present invention, for estimation of the short-term variance of a signal rate of change. This flowchart shows variance detection as actually implemented in AS900 turbofan engine manufactured by Honeywell International, Inc. Thus, it shows several preliminary testing steps 300-304. In step 300, a sensor is read to obtain the tested signal. In step 302, the sensor is tested. In step 304, it is determined whether the reading is valid and, if not, step 370 is executed. If valid, in step 306, the rate of change of the signal is calculated. In step 308, the tested input signal is squared. In step 310, an estimate average of the

squared input signal is obtained via filtering, generating an estimate of the average of x^2 over the short term. In step 320, an estimate average of the input signal is obtained via filtering. It is then squared, generating a squared estimate of the average of x over the short term, for use in step 330. In step 330, an estimate of the short term variance is calculated using the equation for variance: $Var[x] = E[x^2] - E^2[x]$, where E is the expectation operator, or average.

Please replace the following paragraph [0033] with the following rewritten paragraph:

[0033] The preferred embodiments of the present invention were implemented in the fan speed signal (N1) derived from a suitable fan speed transducer or sensor on AS900, and utilize a simple digital IIR filter for estimating the short term averages, according to the equation:

$$y(n) = 0.818\, y(n-1) + 0.091\, x(n) + 0.091\, x(n-1)$$

where: y(n) is the current estimate of the average, y(n-1) is the last value of the estimate of the average, x(n) is the current value of the input to the filter, x(n-1) is the last value of the input to the filter, and x and y are calculated, depending on the sample rate of N1 speed ~~(N1)~~, at a 50ms or 100ms rate. This results in a shift in frequency response of the averager/filter as the sampling rate changes, but produces the desired result in the AS900 N1 speed case.

Please replace the following paragraph [0034] with the following rewritten paragraph:

[0034] Preferably, the latching counter (timer) 250, 450 of the present invention utilizes a unique algorithm that times out faster if the input ~~is~~ constantly ~~true~~ equals one, as shown in Figure 5. The timer times out at a slower rate when the input ~~is true~~ equals one "most of the time". Thus, the rate is dependent on the proportion of time the input ~~is true~~ equals one.